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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,289	02/09/2004	Chang-ho Cho	249/445	8742
27849	7590	08/29/2007		
LEE & MORSE, P.C. 3141 FAIRVIEW PARK DRIVE SUITE 500 FALLS CHURCH, VA 22042			EXAMINER DO, AN H	
			ART UNIT 2853	PAPER NUMBER
			MAIL DATE 08/29/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

TH

# Office Action Summary

Application No.

10/773,289

Applicant(s)

CHO ET AL.

Examiner

An H. Do

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-18 is/are pending in the application.
- 4a) Of the above claim(s) 13-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

The Appeal Brief filed on 20 April 2007 has been acknowledged and considered.

#### ***Response to Amendment***

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

#### ***Claim Objections***

2. Claim 4 is objected to because of the following informalities: claim 4 improperly depends on claim 3 which was cancelled. However, for the purpose of examination, claim 4 is treated as depending on claim 1. Appropriate correction is required.

#### ***Double Patenting***

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

Art Unit: 2853

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 6, 7 and 9-12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2 and 4-6 of U.S. Patent No. 6,886,919. Claims 1, 7, and 9-12 in the pending application for an ink-jet printhead having a metallic heat dissipation layer are covered by claims 1, 2 and 4-6 of Patent '919 except for specifically reciting a restrictor and an ink reservoir instead of an ink channel and a manifold respectively. Claim 1 of Patent '919 shows that is an equivalent structure known in the art. Therefore, because these two elements were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute an ink channel and a manifold for a restrictor and an ink reservoir respectively.

Art Unit: 2853

5. Claims 2, 3, 5 and 8 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2 and 4-6 of U.S. Patent No. 6,886,919 in view of Silverbrook (US Pat. 5,841,452) and Chan (US Pat. 5,710,070).

Claims 1, 2 and 4-6 of U.S. Patent No. 6,886,919 disclose the claimed invention except for reciting the following features:

Regarding claim 2, wherein the restrictor has a length of about 200-750  $\mu\text{m}$ .

Regarding claim 3, wherein the heater surrounds the nozzle.

Regarding claim 4, wherein the heater is formed of one material selected from the group consisting of TaAl, TiN, CrN, W, and polysilicon.

Regarding claim 5, wherein the conductor is formed of aluminum or an aluminum alloy.

Regarding claim 8, wherein each of the plurality of passivation layers is formed of at least one material selected from the group consisting of  $\text{SiO}_2$ ,  $\text{Si}_3\text{N}_4$ , SiC, Ta, Pd, Au, TaO, TaN, Ti, TiN,  $\text{Al}_2\text{O}_3$ , CrN, and  $\text{RuO}_2$ .

Silverbrook teaches the following claimed features:

Regarding claim 2, wherein the restrictor (114) has a length of about 200-750  $\mu\text{m}$  (Col. 6, Lines 11-14, as shown in Fig. 7 that the restrictor (114) is 300 microns deep which falls in the stated range of 200-750 microns).

Regarding claim 3, the heater (120) surrounds the nozzle (111) (Col. 6, Lines 51-54, as shown in Fig. 10).

Regarding claim 4, wherein the heater is formed of one material selected from the group consisting of TaAl, TiN, CrN, W, and polysilicon.

Art Unit: 2853

Regarding claim 5, wherein the conductor (123) formed of aluminum or an aluminum alloy (Col. 7, Lines 24-27).

Regarding claim 8, wherein each of the plurality of passivation layers (144, 142, 136, and 132) are formed of at least one material selected from the group consisting of  $\text{SiO}_2$ ,  $\text{Si}_3\text{N}_4$ ,  $\text{SiC}$ , Ta, Pd, Au, TaO, TaN, Ti, TiN,  $\text{Al}_2\text{O}_3$ , CrN, and  $\text{RuO}_2$  (Col. 7, Lines 6-11 and Lines 38-41 and Col. 6, Lines 25-26 and Col. 8, Lines 33-34).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teachings of Silverbrook with the ink-jet printhead and metallic conductor of U.S. Patent No. 6,886,919 for the purpose of creating printheads to specific drop sizes, to provide appropriate electrical and thermal properties to the conductor to connect the drive electronics to the heater, and to provide electrical insulation and mechanical cushioning to the heater from the force of a collapsing bubble.

1. Claim 4 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2 and 4-6 of U.S. Patent No. 6,886,919 in view of Chan (US Pat. 5,710,070).

Claims 1, 2 and 4-6 of U.S. Patent No. 6,886,919 disclose the claimed invention except for reciting a heater formed out of titanium nitride or TiN.

Chan teaches a heater formed out of titanium nitride or TiN (Col. 2, Lines 10-14).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teaching of Chan into the ink-jet

Art Unit: 2853

printhead of U.S. Patent No. 6,886,919 for the purpose of making the resistor more reliable, especially at higher temperatures and less complicated to manufacture.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 3, 5, 6, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Silverbrook (US Pat. 5,841,452).

Referring to claim 1:

- an ink-jet printhead in [Col. 2, Lines 16-17]
- a substrate in [Col. 1, Lines 64-67]
- an ink chamber [112] to be filled with ink to be ejected formed on an upper surface of the substrate in [Col. 6, Lines 38-41]
- a restrictor [114], which is a path through which ink is supplied from an ink reservoir (beneath [114], any printhead has a reservoir to supply ink to the nozzle) to the ink chamber [112 and 113], perforating a bottom surface of the substrate [100] and a bottom surface of the ink chamber [112 and 113] shown in Figs. 6-9 and below.
- a nozzle plate [142], which is stacked on the upper surface of the substrate and forms an upper wall of the ink chamber in [Col. 8, Lines 21-26] shown in Fig. 11.

Art Unit: 2853

- a nozzle perforating the nozzle plate [142] at a position corresponding to a center of the ink chamber [111] shown in Fig. 11.
- a heater [120] formed in the nozzle plate [142] to surround the nozzle shown in Fig. 11.
- a conductor [123] for applying a current to the heater [120] in [Col. 7, Lines 24-27]

Referring to claim 2:

- the restrictor [114] has a length of about 200-750 microns in [Col. 6, Lines 11-14] shown in Fig. 7 (the restrictor [114] is 300 microns deep which falls in the stated range of 200-750 microns).

Referring to claim 3:

- the heater [120] surrounds the nozzle [111] in [Col. 6, Lines 51-54] shown in Fig. 10.

Referring to claim 5:

- the conductor [123] is formed of aluminum or an aluminum alloy in [Col. 7, Lines 24-27]

Referring to claim 6:

- the nozzle plate includes a plurality of passivation layers [144, 142, 136, and 132] shown in [Col. 7, Lines 6-11 and Lines 38-41] and [Col. 6, Lines 25-26] shown in Fig. 12. (passivation is defined as coating with an oxide layer).

Referring to claim 8:



Art Unit: 2853

- each of the plurality of passivation layers [144, 142, 136, and 132] are formed of at least one material selected from the group consisting of SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub>, SiC, Ta, Pd, Au, TaO, TaN, Ti, TiN, Al<sub>2</sub>O<sub>3</sub>, CrN, and RuO<sub>2</sub> in [Col. 7, Lines 6-11 and Lines 38-41] and [Col. 6, Lines 25-26] and [Col. 8, Lines 33-34].

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 5,841,452) in view of Chan (US Pat. 5,710,070).

Silverbrook discloses the basic elements of the claimed invention except for the heater being formed of one material selected from the group consisting of TaAl, TiN, CrN, W, and polysilicon.

Chan teaches a heater formed out of titanium nitride or TiN in [Col. 2, Lines 10-14].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teaching of Chan with the printhead of Silverbrook for the purpose of making the resistor more reliable, especially at higher temperatures and less complicated to manufacture.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 5,841,452) in view of Lee et al. (US 2002/0008738).

Silverbrook discloses the basic elements of the claimed invention except for the plurality of passivation layers including a first passivation layer, a second passivation layer, and a third passivation layer, which are sequentially stacked on the substrate, and wherein the heater is disposed between the first passivation layer and the second passivation layer, and the conductor is disposed between the second passivation layer and the third passivation layer.

Lee et al. teaches a plurality of passivation layers including a first passivation layer [110], a second passivation layer [150], and a third passivation layer [130], which are sequentially stacked on the substrate [100], and wherein the heater [120] is disposed between the first passivation layer [110] and the second passivation layer [150], and the conductor [140] is disposed between the second passivation layer [150] and the third passivation layer [130] shown in [Paragraph 0052-0059] shown in Fig. 18.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teachings of Lee et al. with the printhead of Silverbrook for the purpose of simplifying the fabricating process compared with conventional manufacturing methods in [Paragraph 0075].

#### ***Response to Arguments***

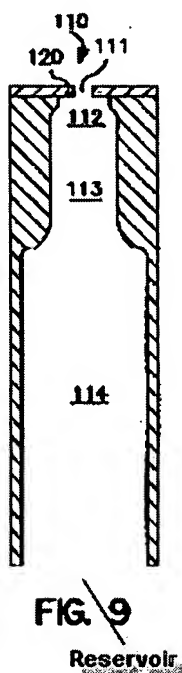
7. Applicant's arguments with respect to claims 1, 2 and 4-12 have been considered but are moot in view of the new ground(s) of rejection. The new ground of double patenting rejection clarifies that the claimed "restrictor" is equivalent to the disclosed "ink

Art Unit: 2853

channel" as shown in Silverbrook. Also, the claimed "ink reservoir" is equivalent to the disclosed "manifold" as shown in Silverbrook. Therefore, the new ground of double patenting rejection is performed as shown above.

8. Applicant's argument regarding the 35 U.S.C. 102 rejection of claims 1, 2, 3, 4, 6, and 8 is noted. From the rejection above, [112 and 113] are directed to the ink chamber only while the reservoir is not shown in the corresponding figure. Ink is supplied from the reservoir (beneath [114], any printhead has a reservoir to supply ink to the nozzle) through the restrictor [114] to the ink chamber [112 and 113] see figure below.

Applicant's argument regarding the 35 U.S.C. 103 rejections made to claims 4 and 7 are noted. The Chan and Lee et al. references teach the missing elements of the claimed invention with respect to their base reference.



Art Unit: 2853

***Contact Information***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to An H. Do whose telephone number is 571-272-2143.

The examiner can normally be reached on Monday-Friday (Flexible).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AD  
August 25, 2007

/An H. Do/  
Primary Examiner  
Art Unit 2853